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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR  | ATTORNEY DOCKET NO.       | CONFIRMATION NO.       |
|---|-------------|-----------------------|---------------------------|------------------------|
| 10/776,472  | 02/11/2004  | Daniel James Branagan | NANO004U                  | 4067                   |
| 32047   | 7590        | 07/13/2007            |                           |                        |
| GROSSMAN, TUCKER, PERREAULT & PFLEGER, PLLC<br>55 SOUTH COMMERICAL STREET<br>MANCHESTER, NH 03101 |             |                       | EXAMINER<br>ZHENG, LOIS L |                        |
|   |             |                       | ART UNIT<br>1742          | PAPER NUMBER           |
|   |             |                       | MAIL DATE<br>07/13/2007   | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                               |  |  |
|------------------------------|-------------------------------|--|--|
| <b>Office Action Summary</b> | Application No.<br>10/776,472 | Applicant(s)<br>BRANAGAN, DANIEL JAMES |  |
|                              | Examiner<br>Lois Zheng        | Art Unit<br>1742                       |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 6,7 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6,7 and 9-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/22/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 April 2007 has been entered.

### ***Status of Claims***

2. Claims 6 and 11-12 are amended in view of applicant's amendments filed 16 April 2007. Claims 1-5 remain withdrawn from consideration. Therefore, claims 6-7 and 9-16 are currently under examination.

Note: The status identifier for claims 13-16 should be "previously presented" since these claims were introduced in the previously filed claim amendment filed on 7 September 2006.

### ***Claim Interpretation***

3. Regarding claims 6 and 11, since no specific order is required for executing processing steps (a) – (d), the examiner is interpreting that the sequence of the claimed processing steps can take place in any order. In addition, since processing steps (a)-(d) recite the same iron based metallic coating alloy and the metal surface is relatively clean(i.e. the cleaned surface may still contain oxides) with the application of the iron based metallic coating alloy, the examiner is interpreting that the processing steps (c)

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and (d) may take place simultaneously(i.e. steps(c) and (d) are the same coating application step) based on the broadest reasonable interpretation.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-7 and 9-16 are rejected under 35 U.S.C. 103(a) as obvious over Dardi et al. US 4,615,864 (Dardi) in view of Dickson et al. US 4,381,943(Dickson).

Dardi teaches a process for coating iron-based using a metallic coating alloy composition comprising 10-50% Cr, 0.1-10% Mn, up to 5% of La, up to 10% Hf, up to 5% Ti, up to 12% Si and balanced with Fe (abstract). Dardi further teaches that its metallic coating is applied by plasma spraying(col. 3 lines 27-31).

However, Dardi does not teach that its metallic coating alloy comprises the claimed boron.

Dickson teaches adding B to iron based metal alloys to create a chemically homogeneous and microcrystalline material for coating substrates, wherein the metal alloy may further comprise Ni, Co, Si, Al, W, Mn, V, Cr and Ti (col. 1 line 67 – col. 2 line 6). Dickson further teaches that when this metal alloy will produce a substantially amorphous coating(col. 2 lines 10-15).

Regarding claim 6 and 11, it would have been obvious to one of ordinary skill in the art to have incorporated boron as taught by Dickson into the metallic coating alloy of Dardi in order to produce a substantially amorphous coating as taught by Dickson.

In addition, the Cr, Hf, La and Ti, in a calculated total amount of 10-70%, in the metallic alloy coating of Dardi in view of Dickson read on the claimed deoxidizing element in the claimed amount range. In addition, since the iron-based metallic alloy coating of Dardi in view of Dickson is applied by plasma spraying, Dardi in view of Dickson inherently teach the claimed melting of the iron-based metallic coating to a liquid state.

Furthermore, the claimed removing of oxidized metal surface layer, which reads on a metal surface with a native oxide layer, to provide a relatively clean metal surface is inherently taking place in the coating application process of Dardi in view of Dickson.

Lastly, the examiner take a position that the claimed ASTM C633 bond strength is an inherent property of the metallic coating layer. Since Dardi in view of Dickson teach the claimed coating process as claimed, the coating layer formed by the coating process of Dardi in view of Dickson would also have an ASTM C633 bond strength of at least 5500psi as claimed. In other words, one of ordinary skill in the art would have found the claimed ASTM C633 bond strength of at least 5500psi obvious in the metallic coating formed by the coating process of Dardi since Dardi uses the same metallic coating as claimed and a same coating process as claimed.

Regarding claim 7, since Dardi in view of Dickson do not teach the presence of precipitates in the liquid state of the coating alloy used for plasma spray coating, the

examiner construes that the precipitates is not present in the molten coating alloy of Dardi in view of Dickson based on the broadest interpretation.

Regarding claim 9-10, the plasma spraying technique of Dardi in view of Dickson reads on the claimed thermal spraying technique.

Regarding claim 12, the Si in the iron-based metallic alloy coating of Dardi in view of Dickson read on the claimed oxygen seeking nonmetal/metalloid as claimed.

Regarding claims 13-16, the 0.1-10% Mn in the metallic alloy coating of Dardi in view of Dickson encompasses the claimed Mn in the amount of about 0.8% or about 2.3%. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed Mn amounts from the disclosed range of Dardi in view of Dickson would have been obvious to one skilled in the art since Dardi in view of Dickson teach the same utilities in their disclosed Mn amount range.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 6-7 and 9-12 filed 16 April 2007 have been considered but are partially moot in view of the new ground(s) of rejection.

In the remarks, applicant argues that Dardi does not teach that its molten metallic alloy does not contain precipitates because Dardi is silent regarding precipitation.

The examiner does not find applicant's argument persuasive since Dardi, now Dardi in view of Dickson not only do not mention the occurrence of precipitation but also teach a process that is substantially the same as the claimed coating process using the same molten metallic alloy coating composition. Therefore, one of ordinary skill in the

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art would have expected that the molten metallic alloy coating as taught by Dardi in view of Dickson to not have precipitates of deoxidizing element as claimed.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LLZ

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